



KILMORE HOSPITAL RESERVOIR RESERVE: ENVIRONS MANAGEMENT PLAN 2011



PREPARED FOR

The logo for Mitchell Shire Council features the word "MITCHELL" in a bold, sans-serif font above a stylized graphic of a sun rising over hills, and the words "SHIRE COUNCIL" in a smaller, sans-serif font below.

Cover photo: Kilmore Hospital Reservoir Reserve from the west bank (Mark Edmonds).

Report Author: Mark Edmonds

Field Survey conducted by: Mark Edmonds, Jeremy Neal and Tanya White

Review and auditing of this report was conducted by Jeremy Neal

Acknowledgements

Vemco Australia wishes to acknowledge the contribution of the following in undertaking this project:

Mitchell Shire Environment Committee for initiation of the plan.

And Mitchell Shire staff:

Elyse Kelly

Colin Smith

Vivian Pasic

Gerard Feain

Scott Gilchrist

Robert Bell

Christine Payne

Stephen Richards

for their valuable input in the development of this plan

Copyright © Vemco Australia

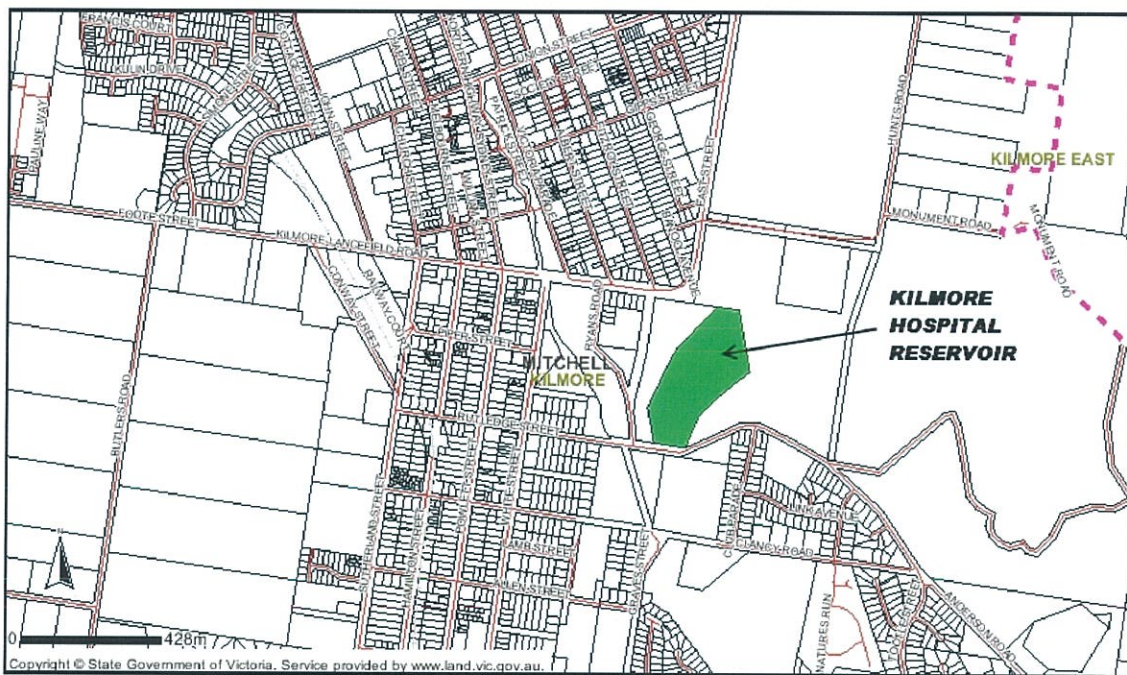
This document is subject to copyright. Unless otherwise agreed to in writing, it may only be used for those purposes for which it was commissioned. The use or reproduction of this report without the consent of Vemco Australia is an infringement of copyright.

Disclaimer

Vemco Australia have taken all necessary measures to ensure that an accurate document has been prepared. However, the company accepts no liability for any damages or loss incurred as a result of the content and recommendations contained within the report.

Executive Summary

The 6.7 hectare Kilmore Hospital Reservoir Reserve is located within the Mitchell Shire Council in the township of Kilmore. The Reserve is aesthetically, historically and socially significant at a local level, having been associated with events, developments and cultural phases which have had a significant role in the occupation and evolution of the community's continuous use of the land for outdoor community purposes from the 1850's until today. The Reserve's natural values make it an attractive setting for visitors as well as providing valuable habitat for local flora and fauna species.



Source: www.land.vic.gov.au

One of the catalysts for initiating the development of this plan is the use of part of the Reserve for the Kilmore Golf Course. Other catalysts include community concern raised about the protection of the environmental and historical assets of the Reserve and the need to keep the Reserve accessible to the general public.

Major management directions are summarised below:

- Identify and manage risks to public health and safety;
- Control impacts caused by off and on site interactions;
- Improve the quantity and quality of native vegetation within the Reserve;
- Develop interpretation of the Reserve's cultural and environmental significance;

- Raise awareness within the community of the Reserve as a recreational venue;
- Formalise the management responsibilities, agreements and quality assurance for the Reserve.

Contents

1	INTRODUCTION.....	7
1.1	<i>Location and Planning area</i>	7
1.2	<i>Regional Context.....</i>	7
1.3	<i>Creation of the Reserve</i>	8
1.4	<i>Reserve Values and Significance</i>	9
1.5	<i>Legislation</i>	10
1.5.1	<i>Federal</i>	10
1.5.2	<i>State</i>	11
1.5.3	<i>Regional and Local</i>	14
2	MANAGEMENT OBJECTIVES.....	155
2.1	<i>Water Source.....</i>	15
2.2	<i>Habitat.....</i>	15
2.3	<i>History.....</i>	16
2.4	<i>Recreation</i>	17
2.5	<i>Reserve Management Aims</i>	17
3	RESOURCE CONSERVATION.....	18
3.1	<i>Geological and Topographic Features.....</i>	18
3.2	<i>Hydrology</i>	18
3.3	<i>Vegetation.....</i>	20
3.3.1	<i>Areas of disturbance</i>	21
3.3.2	<i>Woody weeds.....</i>	21
3.3.3	<i>Groundflora weeds</i>	22
3.3.4	<i>Priority weeds.....</i>	22
3.4	<i>Fauna</i>	23
3.4.1	<i>Existing habitat.....</i>	24
3.4.2	<i>Habitat development.....</i>	24
3.5	<i>Landscape.....</i>	25
3.6	<i>Fire Management</i>	26
3.7	<i>Cultural Heritage.....</i>	26
4	STRATEGIES FOR VISITORS	28
4.1	<i>Public Use and Tourism</i>	28
4.2	<i>Access and Emergency Services.....</i>	28
4.3	<i>Interpretation and Education.....</i>	29

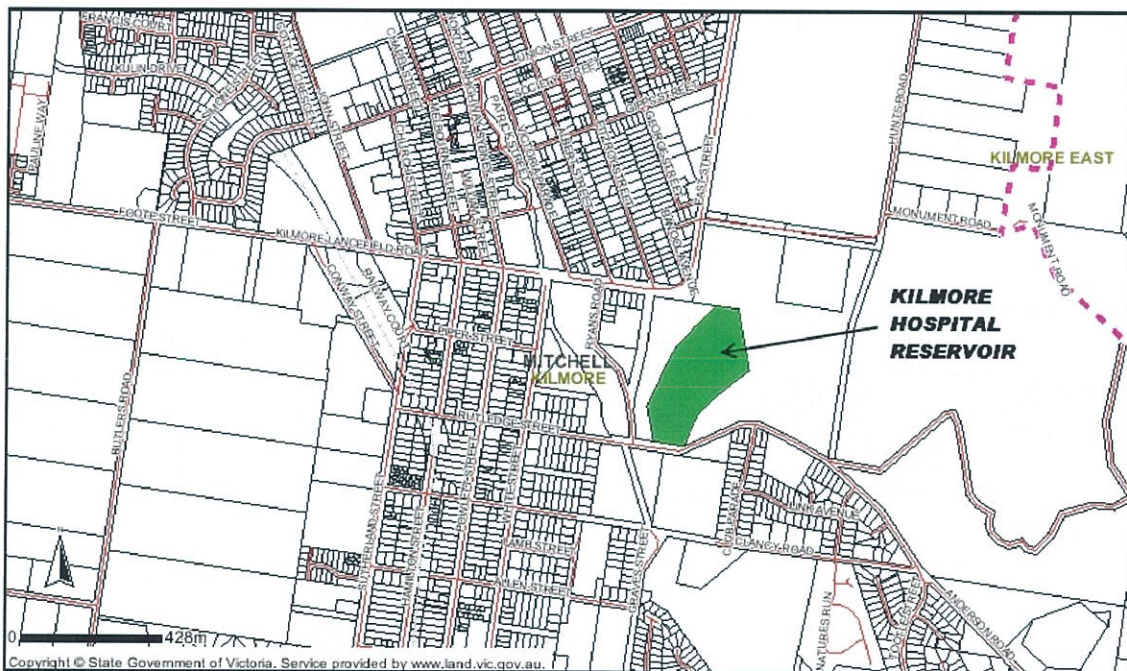
4.4	<i>Public Safety</i>	30
5	COMMUNITY AWARENESS AND INVOLVEMENT	32
5.1	<i>Community Awareness and Reserve Neighbours</i>	32
5.2	<i>Schools/Education</i>	33
5.3	<i>Agency and Stakeholder Partnerships</i>	33
6	OTHER ISSUES	35
6.1	<i>Authorised Uses</i>	35
7	MANAGEMENT OBJECTIVES FOR THE RESERVE	37
8	REFERENCES	Error! Bookmark not defined.9
9	APPENDICES	41
9.1	<i>Native and Indigenous Flora Records</i>	41
9.2	<i>Non-indigenous Flora Records</i>	42
9.3	<i>Fauna Records</i>	43
9.4	<i>Site Aerial Map</i>	44
9.5	<i>Areas Requiring Works and Weed Control</i>	45

1 INTRODUCTION

1.1 Location and Planning area

Kilmore Hospital Reservoir Reserve is located off Rutledge Street, in the rural township of Kilmore within the Mitchell Shire Council, approximately 60 km north of Melbourne.

The Kilmore Hospital Reservoir Reserve is owned by the Mitchell Shire Council, with no formal management agreements currently in place for the use and management of the land and the reservoir itself. It is surrounded by the Kilmore Public Golf Course, which is crown land for which the Council is the Committee of Management and there is a formal agreement with the Golf Club for the use and management of the land. It lies within a Public Resource and Conservation Zone and is covered by a Heritage Overlay (HO104) in accordance with the Municipal Planning Scheme.



Source: www.land.vic.gov.au

1.2 Regional Context

At approximately 350 metres elevation, Kilmore Hospital Reservoir Reserve is situated within the Highlands- Northern Fall Bioregion. Its proximity to Kilmore allows easy access from the town, whilst retaining the values sought by those wanting an outdoor or recreational experience in natural surroundings. The

Reserve is nearby to public open space along the Kilmore Creek and low density residential housing.

The Reservoir and the Kilmore Creek lies nearby to Monument Hill Reserve, which forms an important habitat link to the Mount Piper Biolink. The Mount Piper Biolink exhibits a moderate to high diversity of flora species and vegetation communities, and a range of rare and restricted fauna.

1.3 Creation of the Reserve

The Kilmore Hospital Reservoir Reserve has long been a part of the town's history. In 1862, the Government prepared the area within Kilmore's first Police Paddock, established 1850, for the purposes of creating a reservoir to supply the town with water. The Reservoir had a capacity of 14,466,000 gallons and an area of approximately 13 acres, with 409 acres being defined as a "Water Shed Area" that extended to the top of Monument Hill.

In response to the Reservoir's limited capacity to sustain a growing population, and water quality issues, the Reservoir ceased to function as Kilmore's water supply in 1893. Two years later the establishment of the Kilmore Swimming Club led to the construction of a bathing shed and a 40ft spring board at the Reservoir.



Figure 1: Kilmore Swimming Club change rooms circa.1895

In 1895, around a dozen Radiata Pine *Pinus radiata* were donated by a member of the local constabulary, with another donation of pines made the following year. Eight of these trees still remain on the elevated north-west bank of the

Reservoir. A further 10 pine trees were planted by students from the local State School in 1924, with other members of the community planting a number of Sugar Gum *Eucalyptus cladocalyx* and Mahogany Gum *Eucalyptus botryoides*, Coast Wattle *Acacia sophorae* and *Prunus* species.



During the 1930's, following some

near drownings, a pier was built from the southern shore and a fenced wading pool constructed close to the above ground timber clubrooms on the eastern side of the Reservoir. The concrete wall that forms part of the old diving area (circa 1950's) still exists at the west end near the dam wall.

Nowadays, the Reservoir is mainly used for passive recreation, including walking, cycling and occasional fishing. The development of awareness within the community of these aforementioned activities should be encouraged by all stakeholders.

Source: Mitchell Shire Heritage Study 2006

1.4 Reserve's Values and Significance

The Mitchell Shire Heritage Study, undertaken by Lorraine Huddle Pty. Ltd. in 2006, investigated the history of the Kilmore Outdoor Recreation Precinct, and detailed the significance of Kilmore Hospital Reservoir. The Report found that the Precinct is aesthetically, historically and socially significant at a local level.

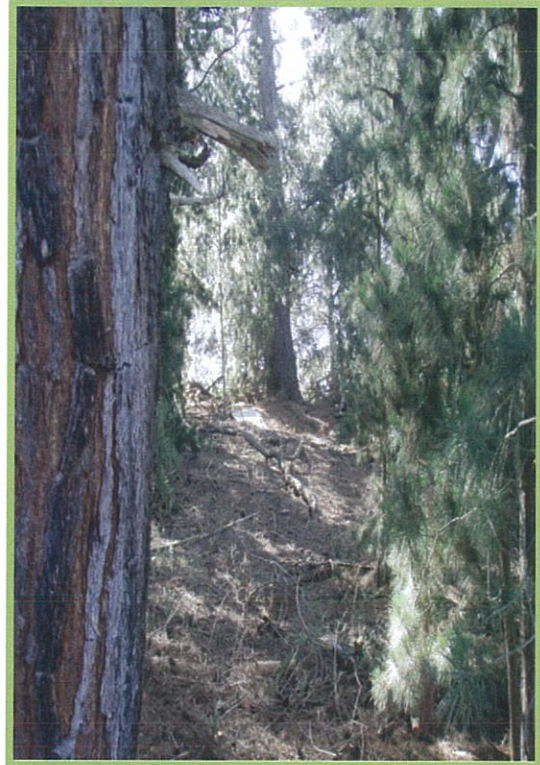


Figure 3: Radiata Pine on the west side of the reservoir

The Reservoir and surrounding precinct is associated with events, developments and cultural phases which have had a significant role in the occupation and evolution of the community's continuous use of the land for outdoor community purposes from the 1850's until today.

Indigenous and exotic vegetation are a significant physical feature, with various 'beautification projects' having taken place over the course of the Reservoir's history. A number of Radiata Pine *Pinus radiata* planted on the west side of the reservoir in 1895/96 and 1924/25 are protected by a heritage overlay (Figure 1). Other notable trees extant from planting projects include Candlebark *Eucalyptus rubida* which can be found in the vicinity of the Reservoir.

For over one hundred years the scenic qualities of the Reservoir's magnificent sheet of water, formed by an earth retaining wall, have been recognised as a picturesque place for outdoor recreation. Used for swimming, fishing and boating, the surrounding grounds and woodlands have been used for carnivals, picnics and walking.

Monument Hill and nearby recreational facilities, including the golflinks, cricket ground and Kilmore Creek, form part of the Kilmore Outdoor Recreation Precinct allowing visitors to enjoy and appreciate a variety of natural and cultural values - these sites make important contributions to preserving the history of Kilmore itself.

Whilst the Reservoir has been a venue for swimming, boating and fishing in the past, current usage by the local population appears limited with a small number of visitors observed walking the track around the reservoir (Huddle 2006). Sections of the Reserve have been occupied by the Kilmore Golf Club as part of the golf course.

1.5 Legislation

The following policies, legislation and documents were consulted during the development of the Kilmore Hospital Reservoir Reserve Environs Management Plan. Where applicable, they are considered the guiding principles that set the direction and any further recommendations that may be required in the management of the Reserve.

1.5.1 Federal

1.5.1.1 Environment Protection & Biodiversity Conservation (EPBC) Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects the environment, particularly matters of National Environmental Significance. It streamlines national environmental assessment and approvals process, protects Australian biodiversity and integrates management of important natural and cultural places. The EPBC Act came into force on the 16th of July 2000.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's principal piece of environment legislation. The EPBC Act protects Australia's native species and ecological communities by providing for:

- identification and listing of species and ecological communities as threatened;
- development of conservation advice and recovery plans for listed species and ecological communities;
- development of a register of critical habitat;
- recognition of key threatening processes;
- where appropriate, reducing the impacts of these processes through threat abatement plans.

The EPBC Protected Matters Report of the 10 kilometre area identified 10 threatened fauna species and 11 migratory bird species that may potentially occur or their habitat may potentially occur within or near to the area of study. It

is considered unlikely that any of these species utilise habitat within the Reserve frequently.

The EPBC Protected Matters Report also identified one Federally protected plant species, Clover Glycine *Glycine latrobeana*, predicted to occur in the local area. Field surveys conducted by Vemco staff in the area of study ascertained that these flora species are not present within the Reserve.

Source: Department of Environment, Water, Heritage and the Arts

1.5.2 State

1.5.2.1 Flora & Fauna Guarantee (FFG) Act 1988

The Flora and Fauna Guarantee Act 1988 (FFG) is the key piece of Victorian legislation for the conservation of threatened species and communities and for the management of potentially threatening processes. The Act applies to both public and private land, however the permit provisions of the Act apply most often to public land. Controls in relation to protection of fauna are provided under the Wildlife Act 1975 and the Wildlife Regulations 2002.

The DSE Advisory List of Rare or Threatened Plants in Victoria 2005 refers to flora and fauna considered rare or threatened in Victoria only, their status elsewhere in Australia or beyond is not considered in assigning Victorian conservation status. Taxa are eligible for inclusion in the list if they are recognised as taxonomically valid by the National Herbarium of Victoria, they currently occur or occurred naturally in Victoria, and they are or are highly likely to be rare or threatened in Victoria. The advisory list contains plants and animals that are considered extinct, threatened, rare or poorly known in Victoria and is maintained by the Department of Sustainability and Environment.

One fauna species, Brush-tailed Phascogale *Phascogale tapoatafa*, and one flora species, Giant Honey-myrtle *Melaleuca armillaris* subsp. *armillaris*, have in recent times (<5years) been recorded in the vicinity of the Reserve. Both species are listed on the DSE Advisory List of Threatened Vertebrate Fauna in Victoria (2007) and the Advisory List of Rare and Threatened Plants in Victoria (2005) respectively, while the Brush-tailed Phascogale is also listed as threatened under the Flora and Fauna Guarantee Act.

Under the FFG, potentially threatening processes that affect threatened species are identified, listed and managed. Key threatening process which may potentially affect fauna occurring within the Reserve include;

- Habitat fragmentation as a threatening process for fauna;
- Increase in sediment input into Victorian rivers and streams due to human activities;
- Invasion of native vegetation by "environmental weeds";
- Predation of native wildlife by the cat *Felis catus*;
- Predation of native wildlife by the introduced Red Fox *Vulpes vulpes*;

- Reduction in biomass and biodiversity of native vegetation through grazing by the Rabbit *Oryctolagus cuniculus*;
- Spread of Sweet Pittosporum *Pittosporum undulatum* in areas outside its natural distribution area.

1.5.2.2 Catchment & Land Protection Act 1994

The Catchment and Land Protection Act 1994 (CaLP) is the primary piece of legislation which addresses environmental management on a catchment scale to enhance long-term productivity and conservation of the environment;

- by establishing the Victorian Catchment Management Council and Regional Catchment Management Authorities;
- by establishing controls on noxious weeds and pest animals;
- placing obligations upon land holders to sustainably and responsibly manage their land;
- requiring landholders to eradicate and control regionally prohibited weeds and to take all reasonable steps to control and prevent the spread of regionally controlled weeds.

1.5.2.3 Planning & Environment Act 1987

The purpose of this Act is to establish a framework for planning the use, development and protection of land in Victoria in the present and long-term interests of all Victorians.

1.5.2.4 Wildlife Act 1975

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife. For the purposes of the Act, wildlife means indigenous vertebrate species (except those declared as pest animals), invertebrate species listed under the FFG, and some introduced game species.

The Wildlife Regulations 2002 of the Act prescribe penalties for the purposes of the Wildlife Act. These include penalties for persons who damage, disturb or destroy any wildlife habitat without appropriate authorisation (Section 9 of the Wildlife Regulations 2002). Authorisation may be obtained under the Wildlife Act through a licence granted under the Forests Act 1958; or for habitat removal that is authorised under any other Act.

1.5.2.5 Fisheries Act 1995

The Act creates a framework for regulation, management, development and conservation of Victorian fisheries, aquatic habitats and ecosystems, aquaculture industries and associated aquatic biological resources. This framework applies to defined 'Victorian waters,' aquariums and hatcheries. The Act aims to protect and conserve fisheries resources, habitats and ecosystems, and promote sustainable commercial fishing. The means in which the Act achieves these aims include;

- Management plans may be created for declared fisheries. 'Fisheries' includes a species of fish or fishing bait, an area of land or waters, a

method of fishing, a type of fishing equipment, a class of boats or a class of licences or permits;

- The Act creates various offences regarding fisheries;
 - creates offences in relation to aquatic biota;
 - creates offences for certain acts without a permit;
- Permits can be issued to allow take, injure, destroy, or hatch biota and species;
- Species may be declared to be a noxious aquatic species;
- Provides that any community of aquatic flora or fauna may be declared to be protected aquatic biota (excludes protected wildlife under Wildlife Act 1975 (Vic) and protected flora under Flora and Fauna Guarantee Act 1988 (Vic)) while any community of fish listed under Flora and Fauna Guarantee Act 1988 (Vic) are deemed to be protected aquatic biota;
- provides that any waters not protected under the National Reserves Act 1975 (Vic) may be declared a fisheries reserve;
- establishes Fisheries Co-Management Council;
- licences are regulated by the Commercial Fisheries Licensing Panel;

1.5.3 Regional and Local

1.5.3.1 Local Government Planning Scheme

The planning scheme controls land use and development within a municipality. It contains State and local planning policies, zones and overlays and other provisions that affect how land can be used and developed. The planning scheme will indicate if a planning permit is required to change the use of land, or to construct a building or make other changes to the land. While the State Government has established the planning schemes for each municipality, each municipality is responsible for administering its own planning scheme.

Under Section 52.17 of the Victorian Planning Provisions, a permit is required from local government to remove, lop or destroy any native vegetation. The purpose of this regulation is to reduce land and water degradation and to provide habitat for plants and animals.

The Reserve is zoned Public Conservation and Resource Zone (PCRZ) in the Mitchell Shire Planning Scheme, the purpose of which is to protect, conserve, and provide facilities for education and interpretation of the natural environment and natural processes for their historic, scientific, landscape, habitat or cultural values. Heritage Overlay (HO104) protects a number of Radiata Pine *Pinus radiata* trees within the Reserve.

1.5.3.2 Council Plan 2009-2013.

The Mitchell Shire Council Plan 2009-2013 contains an Environment strategic objective - "*Council must work with the community to protect and enhance our natural and built environment for current and future generations*". This objective sets the direction for continued community engagement regarding preservation of matters of environmental significance, strategic planning for the future in an

environmentally sustainable manner and the development of programs which protect and enhance the natural environment and (MSC 2009).

1.5.3.3 Goulburn Broken Regional Catchment Strategy 2003

The Regional Catchment Strategy (RCS) provides the context in which the Goulburn Broken catchment community will work with Commonwealth and State agencies, rural and urban water authorities, landholders, the broader community and local government to achieve its vision. The RCS features an updated vision and an assessment of the catchment's natural assets and current and emerging threats such as salinity and declining water quality. The RCS prioritises the actions and works that must occur to address these threats so that effort and funding can be directed where they are most needed.

The RCS also draws together the key elements of a raft of sub-strategies and papers and recognises the fundamental role partnerships between agencies and the catchment community play in achieving environmental goals. The sub-strategies produced in the Goulburn Broken Catchment reflect the evolution of natural resource management. In many cases, these documents were pilots for Victoria and Australia and are well advanced in implementation. They include:

- Goulburn Broken Native Vegetation Management Strategy 2000;
- Goulburn Broken Regional River Health Strategy 2002;
- Goulburn Broken Native Vegetation Plan 2003;
- Goulburn Broken Catchment Regional Catchment Strategy 2003;
- Monitoring, Evaluation and Reporting Strategy for the Goulburn Broken CMA 2004;
- Biodiversity Status and Condition Report 2007;
- Goulburn Broken Catchment Management Authority Annual Report 2008-09;
- Biodiversity Strategy for the Goulburn Broken Catchment 2010-2015 (2010).

Source: Goulburn Broken Catchment Management Authority (2010).

2 MANAGEMENT OBJECTIVES

2.1 Water Source

Scouring and erosion within drainage lines may be exacerbating the deposition of nutrients into the Reservoir. A program to monitor nutrient inputs into the reservoir is advisable to assist in achieving water quality improvements, and a program to address and rectify water quality issues is implemented. A number of drainage points on the eastern side of the Reservoir require improvement, repairs or minor earthworks to address erosion and scouring problems that may be affecting water quality. Appropriate methods for the treatment of these areas are detailed on page 19.

2.2 Habitat

Existing habitat features within the Reserve consist of numerous hollow-bearing trees and stands of established and recruiting *Eucalyptus* and *Acacia* species, which provide refuge and nesting opportunities for a range of fauna species such as bats, climbing marsupials and birds. Grasses and leaf litter within the Reserve provide forage and cover for birds and reptiles. Other native and exotic vegetation, such as the dense stands of willow on the island, also provide some habitat for birds, both as refuge and feeding. Whilst they provide habitat for a limited range of terrestrial species, it is recommended that the willows are removed as they reduce available oxygen within the water, potentially exacerbating algal blooms and reducing habitat quality for aquatic species.

The Reservoir itself contains low diversity aquatic and semi aquatic vegetation providing some habitat value. At the time of the survey numerous waterbirds were observed foraging on the water and in riparian areas. The provision of partially submerged logs within riparian areas will augment existing habitat for birds, frogs and fish. To further add to habitat values the Reservoir can be considered for restocking with fish species. This could be undertaken in consultation with Broadford Angling Club and the Department of Sustainability and Environment.

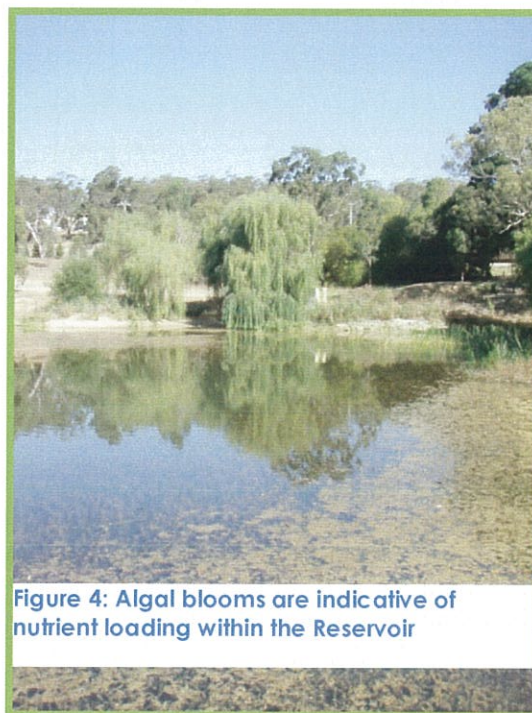


Figure 4: Algal blooms are indicative of nutrient loading within the Reservoir



Figure 5: Large old trees provide essential habitat for a range of fauna species

The staged removal of woody weeds, such as Willow species, and a sensitive weed control program conducted by suitably experienced and qualified weed control contractors will encourage recruitment of indigenous species from the soil seed bank. A dedicated rehabilitation and revegetation program in and around the Reservoir, and restoration of a shrub-layer in areas of existing canopy vegetation throughout the Reserve will improve habitat heterogeneity and connectivity for local and migratory fauna species.

Installation of nesting boxes for birds, bats and marsupials will supplement existing hollows and provide a greater ability to accommodate each species' habitat requirements. There is

potential to engage the Kilmore Men's Shed to construct and supply nesting boxes as required.

This Reserve has the potential to become a significant contributor to biodiversity conservation in the region. It contains a large area of permanent water, numerous habitat trees and is part of the Mount Piper Biolink. The ongoing management of the Reservoir will provide good quality habitat for local and migratory fauna populations.

2.3 History

As detailed in Section 1.3 and 1.4, the Kilmore Hospital Reservoir Reserve is a locally significant location that is rich in history. Whilst the qualities that can be enjoyed by a visitor to the Reserve remain constant, the uses of the Reservoir have changed over the years. This rich history is well documented and should be made available to the casual Reserve visitor by development and installation of interpretive signage.

2.4 Recreation

Though the potential exists for Reserve visitors to utilise the Reservoir for water based recreational activities such as non-motorised boating, there are public risk issues associated with these activities. It is recommended that the use of boats

and canoes on the Reservoir be discouraged and that signage relevant to this management objective be erected in areas where such activities may occur.

2.5 Reserve Management Objectives

- Protect the existing cultural and environmental values of the Reserve;
- Increase the quality and quantity of indigenous flora and habitat for native fauna;
- Provide facilities for the passive uses of the Reservoir and environs;
- Raise awareness within the community of the Reserve as a passive recreational venue, e.g. walking and bird watching;
- Provide opportunities for education with regard to the Reservoir's cultural and environmental significance;
- Control and manage existing and foreseeable impacts caused by offsite interactions;
- Identify and manage risks to public health and safety.

3 RESOURCE CONSERVATION

3.1 Geological and Topographic Features

At around 350 metres elevation the Kilmore Hospital Reservoir Reserve is situated within the Highlands- Northern Fall Bioregion and is part of the Eastern Dissected Uplands- an area where the Great Dividing Range separates streams draining north to the Murray Darling Basin from those flowing southwards directly to the sea. Underlying geology consists of Paleozoic materials in the form of duplex soils, sedimentary rocks and mudstone. The area is dominated by low ridges and isolated hills with shallow valleys and some low level plateaus. The Reservoir itself lies within a depression of the surrounding topography of low lying ridges, with the main local feature being Monument Hill to the east.

Aims

- Minimise the impacts of current management strategies, visitors and other users on Kilmore Hospital Reservoir's geological and landform features.
- Minimise the occurrence of soil erosion caused by management practices and other stakeholders.

Management strategies

- Identify and rehabilitate areas of active erosion;
- Provide interpretive and educational material outlining the geological history of the area.

3.2 Hydrology

The Kilmore Hospital Reservoir Reserve has an average annual rainfall of around 700mm. The area of study is geographically placed within the upper reaches of the Goulburn Broken Catchment, and feeds into the Kilmore Creek that runs into the Kurkurac Creek then to the heritage listed Goulburn River of the Murray Darling basin system.

The area from the Reservoir extending up to Monument Hill was once designated as a Watershed or catchment area to protect the quality of the water entering the town water supply.

Due to the recent decommissioning of the Goulburn-Murray Water Anderson Road Reservoir, the once diverted water will now flow into the Golf Club Reservoir in the Monument Hill Reserve which is upstream of the Reserve. It is expected that inflows into the Reservoir will be significantly higher than at previous times, with the likelihood that water residence times will be shortened,

reducing problems such as algal bloom, which are associated with insufficient water inflows to circulate and/or displace stored water in the Reservoir.

Drainage outlets and lines, particularly those on the eastern side of the Reservoir, are subject to erosion and scouring due to increased water velocity during rain events impacting on poorly designed or maintained outflow sites. A number of points require improvement, repairs or minor earthworks to address these problems that may be affecting water quality.

All works undertaken on drainage lines should be conducted in consultation with the Goulburn Broken Catchment Management Authority. Drainage lines should be stabilised using geotextile/ jute mat and planted out with indigenous grass species. Rock walls or grass swales to slow water velocity should be constructed in areas prone to scouring and erosion so that plants can establish. Planting with a range of indigenous grasses and sedges will assist in extracting nutrients and pollutants that may otherwise enter the Reservoir.



Figure 6: erosion within drainage outlets are reducing water quality

The movement of soil from erosion can be particularly damaging to the water quality within catchment areas. It affects both colour and turbidity, which may affect aquatic plant's ability to take up nutrients, and can cause siltation lower down in the catchment. The affects of soil erosion on rivers and streams and the activities that can

lead to it are classified as a

threatening process under schedule 3 of the Flora and Fauna Guarantee Act. Furthermore, under section 20 of the Catchment and Land Protection Act a land owner must take all reasonable steps to conserve soil and protect water resources.

Aims

- Maintain and improve the integrity of riparian areas to protect water quality and habitat integrity;
- Reduce water nutrient levels entering and present within the Reservoir;
- Protect and develop aquatic environments to improve ecosystem services and biodiversity values.

Management strategies

- Identify areas where sheet and gully erosion is causing excessive inputs into the Reservoir and treat using vegetated swales as a buffer;
- Investigate land management practices occurring within Kilmore Public Golf Course so that goals can be tailored to removing key nutrients and runoff. Irrigation of grassed areas surrounding the reservoir should have a scheduling system to reduce the amount of surface flow in a rain event;
- Drainage outlets on the eastern side of the reservoir are subject to erosion and scouring and require minor improvement repairs or earthworks. Rock walls can be constructed to slow water velocity so that plants can establish.
- Engage specialist wetland revegetation contractor to establish submerged and emergent aquatic vegetation;
- Design and maintain tracks to minimise soil erosion;
- Investigate the reinstatement of the bluestone spillway to an appropriate height to maintain water levels.

3.3 Vegetation

A total of 44 native vascular plant species were identified at the time of survey, though it is expected that some species may not have been recorded due to individual plant species' dormancy (Section 9.1). One Ecological Vegetation Class, Herb-rich Foothill Forest was identified, occupying the eastern and north-eastern side of the Reservoir. Characterised by a mixed Eucalypt upper storey of Manna Gum *Eucalyptus viminalis*, Narrow-leaf Peppermint *Eucalyptus radiata*, Broad-leaf Peppermint *Eucalyptus dives*, Yellow Box *Eucalyptus melliodora*, Swamp Gum *Eucalyptus ovata*, Candlebark *Eucalyptus rubida* and Long-leaf Box *Eucalyptus goniocalyx*, the understorey consists of a large shrub and small tree layer of species such as Blackwood *Acacia melanoxylon*, Silver Wattle *Acacia dealbata* and Cherry Ballart *Exocarpus cupressiformis* over a sparse medium and small shrub layer which includes Golden Wattle *Acacia pycnantha*, Large Kangaroo Apple *Solanum laciniatum*, Drooping *Cassinia arcuata* and Narrow-leaf Wattle *Acacia mucronata*. Indigenous herbs, such as Clustered and Sticky Everlasting *Chrysocephalum* spp., Star and Jersey Cudweed *Helichrysum luteoalbum*, and various Fireweeds *Senecio* spp., appeared mainly as primary colonising regeneration in response to frequent disturbance events such as the stockpiling of fill.

As part of the Mt.Piper Biolink, protected vegetation in reserves and reserves form the main areas of contiguous vegetation. These corridors of vegetation supply important refuge and allow for the movement and dispersal of flora and fauna throughout the landscape. Corridors increase the viability of plant and animal populations by providing genetic connectivity and are likely to be essential to

many species in their response and adaptation to anthropogenic (human induced) climate change.

3.3.1 Areas of disturbance

Areas on the eastern side of the Reservoir showed evidence of recent disturbance, with soil having been removed from fill piles by machinery. These piles are present due to a past history of dredging operations to deepen the Reservoir. Most areas of fill currently have recruiting primary colonising indigenous species and should be left to regenerate. Areas where recent removal of soil has occurred- disturbance of this nature is likely to have a negative effect on vegetation quality in the Reserve and should not be permitted.

Areas of bank erosion along the creek line can be treated using either or both of the following two techniques:

- Geotextiles can be applied to the banks and other surfaces prone to erosion and planted out using a dense coverage of indigenous groundcovers. Middle and upper storey plants can also be used for bank stabilisation. This technique is limited to areas on banks that are able to be planted and are not prone to slumping or collapse;
- To reduce water velocity, rocks can be placed in drainage lines that are deep and narrow, undercut or likely to collapse. Rock should be heavy enough to withstand movement in times of peak water flows.

Improved management opportunities exist to allow vegetation around the Reservoir to contribute significantly to biodiversity, land and water sustainability. Improving the management of indigenous vegetation is an important step in achieving habitat heterogeneity. Improvements to the management of native vegetation could be achieved through controlling exotic and environmental weeds as well as impacts caused by neighbouring land management practices, development of a sensitive weed control program, re-establishment of under storey within areas of existing canopy vegetation, implementation of a canopy replacement strategy within heritage vegetation areas and use of fire to manage excess fuel loads.

Due to the presence of Declared Noxious Weeds the removal or transportation of soils off the property is restricted.

3.3.2 Woody weeds

Many exotic woody species exist in riparian areas within the Reserve (Map-Section 9.5). Gorse *Ulex europaeus*, Blackberry *Rubus fruticosus* and Hawthorn *Crataegus monogyna* appear to have been controlled effectively with only occasional occurrences observed. Removal of Grey Sallow *Salix cinerea* and other exotic species is recommended. Works should be staged to include the re-establishment of native species to offset loss of habitat. Removal of woody

weeds among the stand of pine trees should be conducted in stages, subject to approval by the Mitchell Shire Planning Department. All persons working in the area should be made aware of the heritage listing of some of these trees. Those trees that are heritage listed should be clearly identified. Exotic and environmental woody weeds such as Sallow Wattle *Acacia longifolia*, Sweet Pittosporum *Pittosporum undulatum* and Irish Strawberry *Arbutus unedo* are present in the north-eastern area of the Reserve and should be removed using the cut and paint method.

In all areas of staged woody weed control, follow-up management actions should include control of emerging woody weed species and sensitive weed control which will allow indigenous species to regenerate. Replacing exotic species with suitable indigenous shrubs and trees will ensure that habitat values are improved. All revegetation plantings should be protected by staked tree-guards.

3.3.3 Groundflora weeds

Most areas within the Reservoir surrounds are dominated by exotic grasses and herb species such as Squirrel-tail Fescue *Vulpia bromoides*, Prairie Grass *Bromus catharticus*, Blackberry *Rubus fruticosus* and Spear Thistle *Cirsium vulgare*. The current sparse noxious herbaceous weed coverage should be monitored and sprayed as required (Map- Section 9.4). Reinstatement of a native shrub layer along with natural regeneration should exclude ground layer weeds over time. Sensitive weed control will be required throughout areas of fill, to prevent weed species from competing with native recruitment, whilst minimising indigenous off-target losses.

Some off target damage from herbicide spray drift was noted during field survey. Stakeholders and contractors should only spray when conditions are optimum. Weed control contractors operating within the Reserve should have experience in the identification and management of indigenous vegetation. A weed control program involving two person days per season could expect to improve native vegetation cover significantly.

3.3.4 Priority weeds

Exotic species that should be controlled as a priority are;

- Montpellier Broom *Genista monspessulana*;
- Grey Sallow *Salix cinerea*;
- Gladiolus *Gladiolus* sp. ;
- Blackberry *Rubus fruticosus*;
- Gorse *Ulex europaeus*;
- Sweet Pittosporum *Pittosporum undulatum*;
- Sallow Wattle *Acacia longifolia*;
- Pine *Pinus* species not protected by Heritage controls;
- Spear Thistle *Cirsium vulgare*.

Note- vegetation that is habitat for any Flora and Fauna Guarantee Act listed communities or species, threatened species of flora and fauna or habitat identified in migratory species agreements is attributed the highest conservation significance.

Aims

- Maintain and improve vegetation quality within the Reserve through staged woody weed removal, replacement and enhancement planting and sensitive weed control (Maps- Section 9.5 and 9.6).

Management strategies

- Restore the general landform in areas of recent disturbance and sensitively control weed colonisation in all areas of fill to facilitate natural regeneration of indigenous species from the soil seedbank;
- Prevent further disturbance to areas of fill by creating natural barriers of vegetation and informing neighbouring stakeholders of the purpose of such revegetation;
- Reduce excessive nutrient deposition by creating buffers of vegetation in areas where runoff from the golf course occurs;
- Remove priority woody weeds in stages and follow up immediately with revegetation planting and ongoing weed control;
- Replace senescing heritage listed vegetation with indigenous canopy species;
- Engage a qualified weed control contractor with experience in the management of indigenous vegetation to conduct works in sensitive areas.

3.4 Fauna

A total of 24 indigenous and three exotic fauna species were observed at the time of survey. One significant species, the Pied Cormorant *Phalacrocorax melanoleucos*, was observed during survey. The Pied Cormorant is listed on the Advisory List of Threatened and Vertebrate Fauna 2007.

It is considered that fauna habitat values could be increased with the control of disturbance, improvements in flora diversity and structure - especially at the shrub layer, introduction of partially submerged logs and a reduction in predation from introduced species. Refer to Appendix C for details of fauna species observed during site visits. All native species are protected under the *Wildlife Act 1975* (Vic). There has also been local reports of rabbits, foxes, Indian mynah birds and domestic cats.

3.4.1 Existing habitat

Numerous active hollow bearing trees were identified in the Reserve during field inspections. Fauna species which potentially utilise these hollows include arboreal mammals such as possums, gliders, as well as bats and a variety of bird species. Though existing vegetation provides less than optimal foraging for bird species, revegetation activities can improve fauna habitat significantly. Revegetation planting should be conducted to re-establish a middle storey vegetation layer, with species of provenance selected for their ability to provide food and habitat. A range of species with different flowering times throughout the year will attract a greater diversity and abundance of species.

Habitat values on the island are good despite the dominant presence of exotic vegetation, particularly Grey Sallow *Salix cinerea*. The dense vegetation on the island provides birds with shelter and protection from predators such as foxes and cats. Any disturbance or works on the island should be limited until such a time when habitat improvements are sufficient to protect and support local fauna populations.

3.4.2 Habitat development

Resident and migratory fauna within the Reserve are likely to benefit from the provision of artificial habitat in areas of the Reserve. A range of species specific nesting box designs are available for birds, bats and marsupials. Nesting boxes located throughout the north-east and east side of the reservoir will improve habitat quality for local fauna populations. Certain bird species (Cormorants etc), amphibians and fishes may benefit from logs or vertically driven wooden posts placed in the water. Species to be planted as part of the revegetation program should include *Acacia* species, such as Prickly Moses *Acacia verticillata* and Kangaroo Thorn *Acacia paradoxa*, to provide harbor that is safe from predators.

Aims

- Protect native fauna communities from threatening processes;
- Increase visitor awareness of fauna within the Reserve and interpret issues relating to significant and threatened fauna species.

Management Strategies

- Manage any potentially threatening processes listed under the Flora and Fauna Guarantee Act threatening processes list;
- Enhance arboreal habitat by engaging a contractor to install different sized nesting boxes at various heights;
- Develop an integrated pest animal control program in conjunction with neighbouring stakeholders;
- Remove exotic species that provide harbour for pest animals
- Design and implement habitat enhancement of areas within the water using partially submerged logs and vertically driven wooden posts;

- Consider restocking the Reservoir with fish in consultation with Broadford Angling Club and the Department of Sustainability and Environment;
- Investigate the implementation of a night curfew for cats in the surrounding area.

3.5 Landscape

Kilmore Hospital Reservoir Reserve is situated on the Great Dividing Range, an area between the agricultural and urban Yarra floodplain and the heavily vegetated uplands of the Kingreservoir plateau. Categorized by Leonard and Hammond (1984) as Foothills Landscape, the Reserve lies on moderately inclined slopes with a number of opportunities for scenic views of the surrounding area.

From Kilmore Hospital Reservoir Reserve visitors are able to admire the aesthetics of the area- variation in vegetation structure is evident in the distribution of large trees with a range of middle and lower vegetative layers intergrading with the more manicured surrounds of the golflinks. A number of areas provide the observer with a range of vistas including expansive views across the water and golflinks towards the native bushland of Monument Hill.

From the vantage point at Monument Hill, sections of the Reserve and adjoining golf course can be viewed. Panoramic views from this point give valuable context to the agricultural-urban interface of Kilmore and its surrounds. Visitors can appreciate the diversity of the neighbouring landscape juxtaposed against a mosaic of pastoral allotments and expanding urban development.

Besides inappropriate development, design and materials used during construction and maintenance of Reserve infrastructure, stock piling and dumping of soils are factors likely to affect the visual integrity within the Reserve.

There is potential to add to the Reserve visitor's experience by improving facilities at vantage points along the walking track. Reserve management should evaluate the feasibility of developing of appropriate viewpoints in conjunction with walking tracks, informal seating and interpretative signage routes.

Aims

- Minimise adverse visual impacts on areas of scenic quality;
- Control and minimise actions that are affecting Reserve values, landscape character and aesthetics;
- Evaluate and interpret areas of good scenic value.

Management strategies

- Maintain and improve visual qualities in areas subject to disturbance and prepare a plan for maintenance of such areas;
- Assess impacts on scenic values whenever new facilities are proposed.

3.6 Fire Management

The threat posed to life and property by wildfire in the Reserve and surrounding area is moderate due to accessibility, the Reserve's position in the landscape and fragmented vegetation cover. Dense vegetation is a factor likely to exacerbate fire intensity and rate of spread in a wildfire event. Management of fuel loads, especially surface fine fuels (<6mm in diameter), present challenges when the protection of ecological values and biodiversity are also a priority.

In the event of a fire, responsibility falls upon the local volunteer fire brigade (Kilmore CFA) to respond. Refuge areas and maintenance of access/egress routes to water points will mitigate the potential for loss of life.

A program of ecological burning within the Reserve does not exist at this present time. Appropriate ecological fire regimes are likely to benefit flora and reduce fuel loads and numbers of exotic species.

Aims

- Protect life and Reserve values from negative impacts caused by fire;
- Use appropriate fire management techniques in the successional development of the Reserve's flora and fauna communities.

Management strategies

- Maintain existing fire vehicle access to water points;
- Consider the need to engage suitably experienced and qualified contractors to manage vegetation using prescribed burning;
- Consider the periodic removal of surface fine fuels (<6mm) to reduce fuel loads in areas of native vegetation.

3.7 Cultural Heritage

Prior to European settlement, the Wurrunjerrri section of the Woiworung tribe occupied an area spanning from Melbourne to Euroa, while the Taungurong people lived in areas to the north which include the present day Goulburn catchment. The Reserve itself has been identified as an Area of Cultural Sensitivity as specified in the Aboriginal Heritage Regulations (2007).

Archaeological evidence of the rich history of the Kilmore Hospital Reservoir Reserve remains in the form of public infrastructure. The earth and grass dam wall at the southern end of the Reservoir and the diving area, a 1950's concrete wall at the west end of the wall, are the some of the main cultural assets requiring preservation when managing the Reserve. Other notable assets are the walking path, having been part of the recreation activities for over 100 years. Subsidence occurring in the soil adjoining the wall concrete diving wall was identified at the time of inspection.

Significant trees, of which some are over 100 years old, include the heritage protected stand of Radiata Pine *Pinus radiata* on the western side of the Reservoir and the 200+ year old Candlebark Gums *Eucalyptus rubida* located around the reservoir.

Aims

- With public safety taking priority protect and conserve areas of historical and archaeological significance;
- Monitor and protect vegetation of significance.

Management strategies

- Consider and control negative impacts on matters of cultural significance;
- Develop interpretive material on the cultural heritage of the area;
- Identify and mitigate impacts to cultural assets caused by stakeholders and contractors.

4 STRATEGIES FOR VISITORS

4.1 Public Use and Tourism

A range of opportunities exist to enhance the Reserve user's experience by development of facilities in the Reserve. Implementation of environmental works proposed within this plan will improve flora diversity and abundance over time, making the Reserve a haven for birds and bats. Following implementation of the Mitchell Shire Council Domestic Animal Plan (2009) as a working document, it is recommended that all dogs are 'kept on the lead' and that dog waste bags are available to the Reserve user at strategic points around the Reservoir to reduce impacts to fauna and water quality.

Development of the Reserve as a multifaceted recreational venue for activities such as fishing and bird watching is recommended to further increase patronage. A limited number of bench seats made from natural materials should be established around the Reservoir, ideally in areas of high scenic value. In the interest of preserving Reserve environmental values, the establishment of rubbish bins and designated fishing points on the Reservoir's surrounds is not recommended.

Aims

- Provide the Reserve user with a range of passive recreational facilities to enhance and complement existing uses.

Management strategies

- Consider the construction of a bird-hide on the north-western edge of the reservoir;
- Restock the reservoir with fish in liason with Broadford Angling Club and the Department of Sustainability and Environment;
- Establish bench seats made from natural materials in areas of high scenic value within the Reserve;
- Establish dog waste bags at entrances to the Reserve;
- Following implementation of the Domestic Animal Plan (2009) inform Reserve users that dogs must be 'kept on the lead' using signage at Reserve entrances.

4.2 Access and Emergency Services

Visitor access to the Reserve from Kilmore township is generally from Rutledge Street, where limited informal car reserveing is available on the north side of the road. Road markings opposite this area are not likely to impede car access/egress as they are single white lines. Currently there is no directional

signage to the Reserve from Kilmore township or the main road. Access to the Reservoir for emergency vehicles to source water is attainable from Foote Street where a path from the golf course entrance road leads downhill between the Pine trees and the golf course. Water access points have been constructed some time ago and appear sufficiently maintained.

Vehicle access within the Reserve is limited to a single-lane lightly graveled track on the northern side of the Reservoir. Pedestrian and bicycle access around the Reservoir is via a low grade unsealed walking track which crosses areas of the golf links. The occasional protrusion of tree roots through the pathway presents risks to Reserve visitors and should be rectified.

To maintain the Reserve's environmental values, it is recommended that no formal access to the water for boats and canoes is developed in the near future, and that the use of motorised water vehicles on the Reservoir is prohibited.

Aims

- Maintain safe and appropriate access for vehicles and pedestrians;
- Increase visitor awareness of, and access to the Reserve.

Management strategies

- Formalise vehicle reserveing spaces and erect reserveing signage in the Rutledge Street road reserve (Section 9.6);
- Liaise with the appropriate authority to develop signage indicating 'gateway' access points;
- Maintain existing paths and emergency vehicle water points;
- Further investigate allowing recreational non motorised boats and canoes on the reservoir;
- Investigate development of a continuous walking path around the Reservoir, in consultation with the Kilmore Golf Club.

4.3 Interpretation and Education

Information on the Reserve's natural values should be accessible and informative so that the visitor experience is enhanced. On site interpretative material to the Reservoir's rich cultural history and environmental values currently does not exist. Management strategies and desired outcomes may also be interpreted so that visitors to the site are aware of their role and responsibilities. It is highly desirable that a range of informative resources be developed to enhance visitor appreciation.

Aims

- Provide visitor orientation to key aspects of the Reserve including areas of risk;
- Inform visitors of appropriate behavior during their Reserve visit;

- Provide excellent information and interpretation services and resources.

Management strategies

- Install interpretative information that relates the historical, cultural and environmental richness of the Reservoir;
- Develop a visitor information board that conveys management objectives and desired outcomes.

4.4 Public Safety

Reserve visitors confront a number of risks present within the Reserve that are posed by activities conducted by neighbouring stakeholders. Dangers associated with visitor activities in the Reserve include threats posed by existing infrastructure, discarded materials in the form of building waste, injury during recreational activities and hazards presented by stinging or biting animals.

The assessment and appropriate design response to hazards presented by existing infrastructure should be scheduled regularly to control risks to Reserve users. Areas that may present public safety risks, such as the diving platform at south-western end of Reservoir, and exposed tree roots on walking tracks, may require fencing or resurfacing respectively, especially as visitor use of the Reserve increases. Discarded waste materials, such as asbestos pipes in the pine area, should be identified and managed safely. A regular inspection program should include all public facilities and infrastructure.

Due to the proximity of the Reserve to the golf links, the risk of Reserve visitors being hit by golf balls is especially apparent on the eastern side of the Reservoir, where certain areas of the walking track cross or run parallel to the golf range. There are inherent dangers associated with water based activities, such as boating and swimming.

Aims

- Manage public safety risks effectively and efficiently.

Management Strategies

- Install signage informing visitors of health and safety hazards in key areas of the Reserve, including areas where access is restricted, dogs are required to be on the lead and boating is not permitted on the Reservoir;
- Undertake a full risk assessment of Reserve assets and minimise public safety risks to a level appropriate to the setting;
- Engage the Kilmore Golf Club to develop solutions to the risks posed by golfing activities and consider vegetative buffers and/or the erection of high cyclone fencing in high risk areas;
- Investigate the onus of public liability cover in areas within the Reserve that are utilised by the Kilmore Golf Club;

- Install signage on the golf course to indicate the potential risk posed by errant golf balls.

5 COMMUNITY AWARENESS AND INVOLVEMENT

5.1 Community Awareness and Reserve Neighbours

Participation by neighbours, local environment and conservation groups and volunteers can be of significant benefit to Reserve environmental values. Currently there is little engagement with the wider community regarding management of the Reserve, and blurred responsibilities about the Reserve's management and the neighbouring Kilmore Golf Club.

Overtime, the reserve has been encroached upon by the development. Whilst the boundaries remain indistinct on ground, planning maps indicate significant areas of the Reserve that are now occupied by golfing greens. Issues presented by this blurring of ownership come in the form of public liability, management rights and responsibilities, and strategic planning. Consultation with the Kilmore Golf Club management is required as a priority to relay and achieve management strategies, particularly in the areas of public recreation and environmental goals. Any formal agreement must include allocation of management responsibility and an appropriate on ground response to issues highlighted within this plan.

The potential exists for greater participation by environmental and historical groups and other community organisations in furthering biodiversity and heritage objectives. Facilitation of events, such as rehabilitation and revegetation projects, would need to be conducted by management to ensure conservation objectives are met. It is recommended that greater community involvement in fostered by management.

Aims

- Raise awareness with all stakeholders of the importance of environmental management strategies;
- Recognise and improve the protection of heritage assets and recreational opportunities;
- Encourage volunteer and community participation to raise awareness of issues affecting local biodiversity in the Reserve.

Management Strategies

- Engage the Kilmore Golf Club to work towards achieving management strategies through cooperation and consultation;
- Formalise, monitor and enforce these management strategies;
- Encourage support from Kilmore Golf Club members, local environmental and historical groups, recreational groups, the Kilmore Country Fire Authority and other community groups to further management objectives;

- Develop and implement a volunteer and community involvement strategy targeting local conservation groups.

5.2 Schools/Education

As the manager of the Reserve, there exists opportunity for Mitchell Shire to engage local school groups interested in practical environmental education and local history by conducting revegetation planting days in less sensitive areas. Such activities can improve participant's understanding of the Reserve's environmental values while working towards achieving biodiversity goals, as well as furthering understanding of the rich cultural history of the Reserve. Revegetation in sensitive areas should be conducted by experienced bushland regenerators to avoid damage to native vegetation.

Aims

- Increase awareness of Reserve values and foster "connection" with the local environment.

Management strategies

- Engage local school and community groups to implement revegetation plans in less sensitive areas;
- Provide interpretive tours to school groups.

5.3 Agency and Stakeholder Partnerships

The Mitchell Shire is responsible for the overall management of the Kilmore Hospital Reservoir, though other agencies and stakeholders often conduct activities or have legislative responsibilities within the Reserve. Issues that relate to the management of the Reserve are more likely to be resolved effectively and in a timely manner if agencies and stakeholders adopt a collaborative approach thereby enabling the successful delivery of programs to achieve management objectives.

Agencies and stakeholders that Mitchell Shire representatives may seek to liaise and collaborate with include;

- Department of Sustainability and Environment for the planning and management of environmental values, and threatening processes;
- Goulburn Broken Catchment Management Authority to collaborate in achieving goals of the Regional Catchment Management Strategy and to ensure that the management strategies for the Reservoir do not impact upon catchment water quality or the health of riparian areas downstream;
- Goulburn-Murray Water in respect to provision of licenses to extract water for irrigation from the Reservoir;
- Country Fire Authority in relation to the maintenance of safe access to water points in the Reserve;

- Mitchell Shire Environment Committee and the Department of Sustainability and Environment to make formal recommendations on matters concerning the management of the natural environment;
- Kilmore Golf Club which uses areas within the Reserve as part of the Club's golf links;
- BEAM Mitchell Environment Group for the development and implementation of environmental strategies to improve habitat diversity and connectivity;
- Department of Primary Industries for input into the development of the Reserve as a recreational fishing venue and for pest plant and animal issues;
- Broadford Angling Club in regards to restocking the Reservoir with fish;
- Regional tourism authorities to assist in the promotion of the Reserve in tourist information centres as Reserve visitation increases;
- Kilmore Cricket Club;
- Trustees of the Kilmore Racecourse;
- Kilmore Historical Society;
- Kilmore Pony Club.

6 OTHER ISSUES

6.1 Authorised Uses

Extraction of water from the Reservoir for irrigation is currently controlled and authorised by the responsible authority, Goulburn Murray Water. The extraction of water must occur within the area authorised and at specified volumes of the license.

Further investigation and consultation is required to establish terms and conditions of the ongoing use of areas of the Reserve by Kilmore Golf Club.

Aim

- Minimise the impacts of occupancies on the natural and cultural values and recreational amenity of the Reserve and ensure equitable share of water resources within the community.

Management Strategies

- Ensure that all occupancies are authorised and appropriately managed;
- Survey and demarcate the Reserve boundaries;
- Establish management responsibility of areas within the Reserve occupied by the Kilmore Golf Club grounds;
- Include controls on the types of and operational times of water pumps, realising that there is no electrical power currently available at the site;
- Formalise the water entitlements to ensure equitable and fair supply considering all stakeholders, whilst ensuring the environmental values of the Reservoir are not compromised.

7 MANAGEMENT OBJECTIVES FOR THE RESERVE

Costs are estimates and may vary with the extent and timing of works undertaken. A more detailed fee costing structure can be provided once the scope of works has been defined.

ACTION	YEAR	COST Per year
Consultation		
Engage all stakeholders for input into the draft plan.	1	\$1300
Resource Conservation		
Engage an experienced weed spraying contractor to conduct works in sensitive and recently cleared areas.	1-5	\$6240
Conduct staged removal of priority woody weeds.	1-5	\$7680
Conduct revegetation in areas cleared of woody weeds.	1-5	\$9320
Install large partially submerged logs as habitat.	2	\$6400
Engage a wetland revegetation contractor to establish submerged and emergent vegetation in summer.	3-5	\$4660
Engage a contractor to install nesting boxes in appropriate locations around the Reservoir.	3	\$920
Develop and implement a water quality monitoring program.	1-5	\$3780
Investigate implementing in the surrounding area a night curfew for cats	1	
Reserve Protection		
Maintain existing fire vehicle water access points.	1-5	\$780
Undertake drainage repair works where required.	1	\$5000
Install erosion control measures along drainage lines and revegetate.	1	\$9320
Reinstate the landform and revegetate areas subject to recent disturbance by machinery.	2	\$2630
Create nutrient buffers by revegetating areas subject to sheet erosion and runoff.	2	\$3120
Control pest rabbits in conjunction with neighbouring stakeholders.	1-3	\$4000
Reserve Amenities		
Formalise vehicle reserveing spaces by using signage.	1	\$1200
Investigate the need for traffic control measures in the vicinity of the proposed car reserveing area and implement recommendations.	1	N/A

ACTION	YEAR	COST
Install signage indicating dogs must be kept on the lead.	1	\$1200
Establish dog waste bags at entrances to the Reserve.	1	\$1500
Establish bench seats in areas of high scenic value.	1	\$5500
Assess the impacts and costs related to development of a continuous walking path around the Reservoir	1	\$3200
Restock the reservoir with fish in liaison with Broadford Angling Club and Department of Sustainability and Environment.	2-5	\$1450
Prepare an information and interpretation plan for the Reserve.	4	\$2880
Develop signage indicating 'gateway' access points.	4	\$3400
Construct a bird-hide on the north-western edge of the reservoir.	5	\$6800
Risk Management and Authorised Uses		
Survey and demarcate the Reserve boundaries.	1	\$1500
Undertake a full risk assessment of Reserve assets.	1	\$1800
Assess and maintain walking track surface to a standard appropriate to visitor use.	1-5	\$1560
Install signage informing the visitor of health and safety hazards in key areas of the Reserve.	1	\$1200
Ensure that all occupancies are authorised and managed.	1	\$5600
Investigate the onus of public liability in areas shared by the golf course.	1	\$520
Consider the feasibility of installation of high cyclone fencing in high risk areas.	As required	
Community Awareness and Involvement		
Engage the Kilmore Golf Club to work towards achieving management strategies.	1-5	\$900
Interpret Reserve values to local community and school groups.	1-5	\$2400
Engage local community and school groups to implement weed control, revegetation and other aspects of the plan.	2-5	\$3900
Monitoring		
Develop and implement a Reserve inspection and maintenance plan.	1-5	\$1280
Monitor the infrastructure and the water quality of the Reservoir.	1-5	\$1000
Engage the community to support ongoing water quality monitoring with the relevant authority.	1-5	\$720
Monitor visitor numbers and use.	1-5	\$450

8 REFERENCES

- Australian Department of Environment, Water, Heritage and the Arts. (Date unknown). *Key threatening processes under the Environment Protection Biodiversity Conservation Act*.
<http://www.environment.gov.au/biodiversity/threatened/ktp.html>
- BEAM Mitchell Environment Group. (2008). *Submission to Land and Biodiversity at a time of climate change Green Paper*. BEAM Mitchell Environment Group.
- Goulburn Broken Catchment Management Authority. (2010). Author unknown. *Biodiversity Strategy for the Goulburn Broken Catchment 2010-2015*.
- Huddle, L. (2006). *Mitchell Shire Heritage Database*. Mitchell Shire Heritage Study 2006.
- Mirchell Shire Council (2009). *Mitchell Shire Council Domestic Animal Plan*.
- Mitchell Shire Council. (Date unknown). *Environmental Groups and the Mitchell Shire Environment Committee*. <http://www.mitchellshire.vic.gov.au>
- Mitchell Shire Council. (MSC 2006). *Council Plan 2006-2010*.
- Mitchell Shire Council. (MSC 2009). *Council Plan 2009-2013*.
- Planning and Environment Act.(2007)
http://www.austlii.edu.au/au/legis/vic/consol_act/paea1987254/
- Victorian Department of Planning and Community Services. (2010). *Planning Maps Online*. <http://services.land.vic.gov.au>
- Victorian Department of Sustainability and Environment- Victoria (2008). *Flora and Fauna Guarantee Act 1988. Threatened List, November 2008*.
- Victorian Department of Sustainability and Environment- Victoria (2008). *Flora and Fauna Guarantee Processes List November 2008*.
- Victorian Department of Sustainability and Environment- Victoria (2008). *Advisory List of Rare or Threatened Plants in Victoria 2005*.
- Victorian Department of Sustainability and Environment- Victoria (2007). *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007*.
- Victorian Department of Sustainability and Environment. (2010). *Biodiversity Interactive Maps*: www.dse.vic.gov.au/mapshare
- Wildlife Act. (1975) http://www.austlii.edu.au/au/legis/vic/consol_act/wa197593/

9 APPENDICES

9.1 Native and Indigenous Flora Records

Botanical Name	Common Name
TREES	
<i>Eucalyptus dives</i>	Broad-leafed Peppermint
<i>Eucalyptus goniocalyx</i>	Long-leaf Box
<i>Eucalyptus melliodora</i>	Yellow Box
<i>Eucalyptus ovata</i>	Swamp Gum
<i>Eucalyptus rubida</i>	Candlebark
<i>Eucalyptus radiata</i>	Narrow-leaf Peppermint
<i>Eucalyptus viminalis</i>	Manna Gum
LARGE SHRUBS	
<i>Acacia dealbata</i>	Silver Wattle
<i>Acacia melanoxylon</i>	Blackwood
<i>Acacia mucronata</i>	Narrow-Leaf Wattle
<i>Cassinia arcuata</i>	Drooping Cassinia
<i>Exocarpos cupressiformis</i>	Cherry Ballart
MEDIUM, SMALL SHRUBS	
<i>Acacia pycnantha</i>	Golden Wattle
<i>Grevillia rosmarinifolia</i>	Rosemary Grevillea
<i>Senecio minimus</i>	Shrubby Fireweed
<i>Senecio quadridentatus</i>	Cotton Fireweed
<i>Senecio tenuiflorus</i>	Slender Fireweed
<i>Solenum laciniatum</i>	Large Kangaroo Apple
HERBS, CREEPERS	
<i>Amyema spp.</i>	Mistletoe
<i>Acaena novae-zelandiae</i>	Bidgee Widgee
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting
<i>Marsilea drummondii</i>	Common Nardoo
GRASSES	
<i>Austrodanthonia caespitosa</i>	Common Wallaby Grass
<i>Austrodanthonia sp.</i>	Wallaby Grass
<i>Austrodanthonia setacea</i>	Bristly Wallaby-grass
<i>Austrodanthonia racemosa var. racemosa</i>	Striped Wallaby-grass
<i>Austrostipa bigeniculata</i>	Kneed Spear-grass
<i>Austrostipa mollis</i>	Supple Spear-grass
<i>Austrostipa rudis</i>	Veined Spear-grass
<i>Carex appressa</i>	Tall Sedge
<i>Carex sp. (thin leaf) tasmanica/inversa</i>	Sedge
<i>Dianella revoluta var. revoluta</i>	Black-anther Flax-lily
<i>Juncus flavidus</i>	Rush
<i>Juncus procerus</i>	Rush
<i>Juncus sarophorus</i>	Rush

<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
<i>Paspalum dilatatum</i>	Paspalum
<i>Poa labillardierei</i>	Common Tussock-grass
<i>Themeda triandra</i>	Kangaroo Grass
AQUATICS	
<i>Baumea articulata</i>	Jointed Twigrush
<i>Eleocharis dulcis</i>	Chinese Water Chestnut
<i>Myriophyllum papillosum</i>	Common Watermilfoil
<i>Persicaria decipiens</i>	Slender Knotweed
<i>Triglochin procerum</i>	Water Ribbons

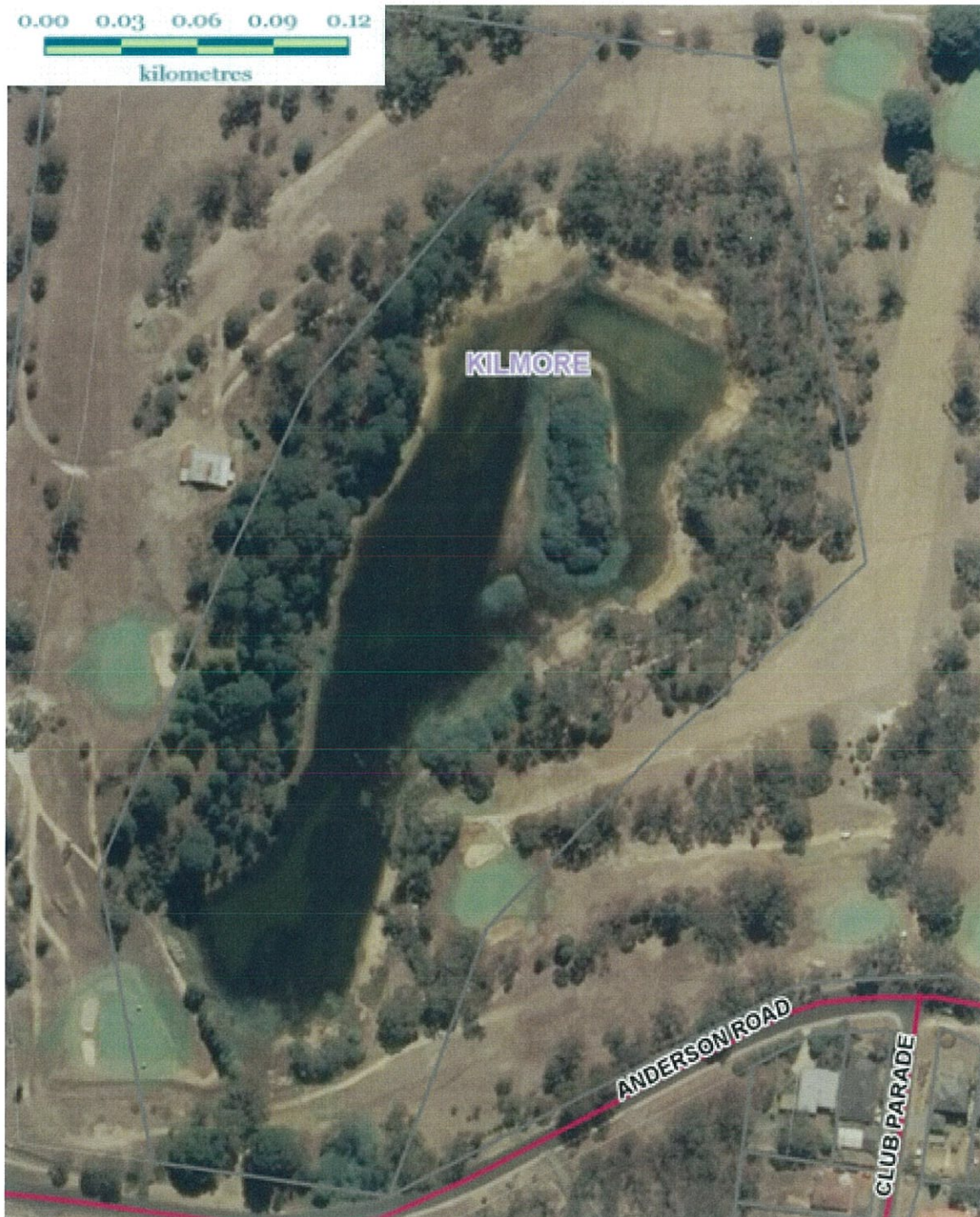
9.2 Non-indigenous Flora Records

Botanical Name	Common Name	Status
<i>Acacia longifolia</i>	Sallow Wattle	environmental
<i>Alopecurus pratensis</i>	Meadow Foxtail	
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	
<i>Arbutus unedo</i>	Irish Strawberry	
<i>Bromus catharticus</i>	Prairie Grass	
<i>Centaurium minus</i>	Centaury	
<i>Cirsium vulgare</i>	Spear Thistle	noxious
<i>Cortaderia selloana</i>	Pampas Grass	
<i>Crataegus monogyna</i>	Hawthorn	noxious
<i>Diploaxis</i> spp.	Mustard Weed	
<i>Genista monspessulana</i>	Montpellier Broom	noxious
<i>Gladiolus</i> sp.	Gladiolous	
<i>Hirschfeldia incana</i>	Buchan Weed	noxious
<i>Holcus lanatus</i>	Yorkshire Fog	
<i>Phalaris aquatica</i>	Phalaris	
<i>Picris echioides</i>	Bristly Ox tongue	noxious
<i>Pinus radiata</i>	Radiata Pine	
<i>Pittosporum undulatum</i>	Sweet Pittosporum	environmental
<i>Plantago lanceolata</i>	Ribwort	
<i>Polygonum aviculare</i>	Wireweed	
<i>Prunus</i> spp.	Plum	
<i>Rubus fruticosus</i>	Blackberry	noxious
<i>Rumex crispus</i>	Curled Dock	
<i>Salix cinerea</i>	Grey Sallow	
<i>Senecio pterophorus</i>	African Daisy	noxious
<i>Sinapis arvensis</i>	Wild Mustard	
<i>Ulex europaeus</i>	Gorze	noxious
<i>Vulpia bromoides</i>	Squirrel-tail Fescue	
<i>Watsonia meriana</i> var. <i>bulbillifera</i>	Wild Watsonia	noxious

9.3 Fauna Records

Scientific Name	Common Name	Exotic/Native
<i>Chenonetta jubata</i>	Australian Wood Duck	native
<i>Anas superciliosa</i>	Pacific Black Duck	native
<i>Anhinga melanogaster</i>	Darter	native
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	native
<i>Phalacrocorax varius</i>	Pied Cormorant	native
<i>Ardea novaehollandiae</i>	White-faced Heron	native
<i>Threskiornis molucca</i>	Australian White Ibis	native
<i>Porphyrio porphyrio</i>	Purple Swamphen	native
<i>Fulica atra</i>	Eurasian Coot	native
<i>Vanellus miles</i>	Masked Lapwing	native
<i>Ocyphaps lophotes</i>	Crested Pigeon	native
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	native
<i>Playcerus elegans elegans</i>	Crimson Rosella	native
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	native
<i>Pardalotus punctatus</i>	Spotted Pardalote	native
<i>Sericornis frontalis</i>	White-browed Scrubwren	native
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	native
<i>Rhipidura fuliginosa</i>	Grey Fantail	native
<i>Passer domesticus</i>	House Sparrow	exotic
<i>Grallina cyanoleuca</i>	Magpie-lark	native
<i>Gymnorhina hypoleuca</i>	White-Backed Magpie	native
<i>Corvus coronoides</i>	Australian Raven	native
<i>Acridotherus tristis</i>	Common Myna	exotic
<i>Wallabia bicolor</i>	Swamp Wallaby	native
<i>Pseudocheirus peregrinus</i>	Ring-tailed Possum	native
<i>Oryctolagus cuniculus</i>	Rabbit	exotic
<i>Vulpes vulpes</i>	Red Fox	exotic

9.4 Site Aerial Map



9.5 Areas Requiring Works and Weed Control

